Neither Boon nor Bane: The Economic Effects of a Landscape-Scale National Monument

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ABSTRACT *The designation of landscape-scale national monuments has generated intense debate as to whether their regional economic effects are positive or negative. National monuments can restrict land uses, thus favoring economic development based on the low-wage tourism industry relative to higher-wage extractive industries. Utah's Grand Staircase–Escalante National Monument has been managed for landscape-scale conservation while protecting existing valid uses. We assess postdesignation trends in the ranching, mining, and tourism industries, after which pre- and postdesignation paths of per capita income are examined using difference-in-differences and synthetic control methods. We conclude that monument designation had no effect on regional per capita income.* (JEL Q58, R11)

1. Introduction

Using authority delegated by Congress under the Antiquities Act, President Bill Clinton declared 1.7 million acres of federally administered land in southern Utah as the Grand Staircase–Escalante National Monument (GSENM) on September 18, 1996. Designation of the GSENM set off a political firestorm that has simmered and periodically flared over the subsequent 20 years. In the final year of President Barack Obama's presidency, a series of monument designations totaling nearly 3.5 million acres in California, Maine, Nevada, and Utah reignited legislative concerns regarding the use of the Antiquities Act. Numerous local, state, and federal government officials denounced the Obama monuments as imposing economic hardship on local regions, as had happened with the designation of landscape-scale national monuments by President Clinton.

On April 26, 2017, President Donald Trump signed an Executive Order 13792 directing the Secretary of the Interior to review all monuments greater than 100,000 acres and designated since January 1, 1996, to assess, among other things, the "economic development and fiscal condition of affected States, tribes, and localities;" (Trump 2017). Interior Secretary Ryan Zinke has stated that the EO 13792 review will evaluate "loss of jobs, reduced wages, and reduced public access" (Eilperin 2017). However, recent proclamations under the Antiquities Act have been crafted to minimize disruption to ongoing economic activities that are compatible with monument designation. For example, management of the GSENM is "subject to existing valid uses" of federal land and, further, should not "affect existing permits or leases for, or levels of, livestock grazing on Federal lands within the monument" (Bureau of Land Management 2000).

More than 20 years later, the Grand Staircase–Escalante remains controversial both locally and among Utah's congressional delegation, which unanimously pushed to have the GSENM included in the EO 13792 review. Writing about environmental policies in general, Anderson and Mizak (2006) offer a public choice perspective for ongoing opposition to the GSENM, hypothesizing a political and economic disconnect between urban and rural constituencies. Environmental interest groups, which the authors state are largely composed of relatively wealthy people living in urban regions, have influenced government policies "to demand environmental amenities which negatively affect rural landowners" (p. 137).

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The authors cite designation of the GSENM as a key example of an urban bias against rural residents due to "the obvious economic harm it brought to rural Utah residents."

Given the controversy surrounding designation of national monuments, a careful analysis of their economic effects is in order. A review of the economics literature reveals that assertions of economic harm or benefit due to national monuments (such as that by Anderson and Mizak [2006]) find little empirical support; in fact, there has been *no* refereed study focusing on the economic effects of landscape-scale national monuments. In contrast, national parks have been found to be important regional economic drivers (Gabe 2016; Wilkerson 2003). Within the realm of national monuments, multiple studies have found that a change in designation from a national monument to a national park increases visitation (Cline, Weiler, and Aydin 2011; Weiler 2006; Weiler and Seidel 2004). Other economic analyses of protected public lands will aggregate various types of protected land (national parks, designated wilderness, national monuments, etc.) into a single category so that the effect of any one type of protected land is conflated with other protective designations (e.g., Rasker et al. 2012; Lewis, Hunt, and Plantinga 2002). This dearth of national monument studies is all the more remarkable in that assertions that a newly designated national monument will cause economic damage are nearly always countered by claims that the same newly designated national monument will provide an economic boon to the region. Both claims cannot be correct.

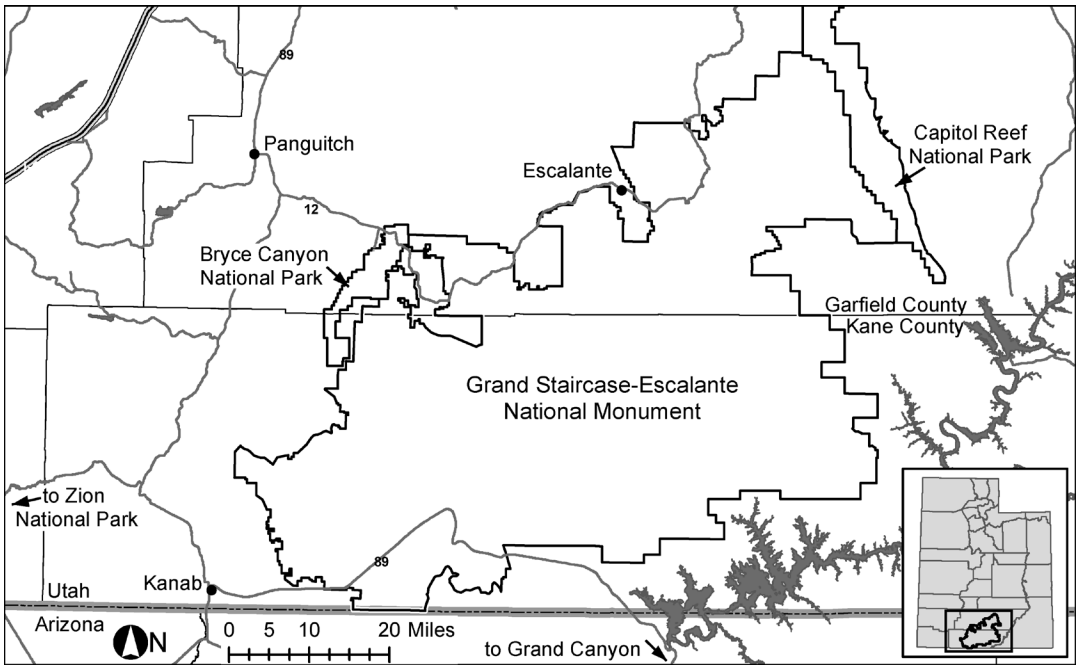
Landscape-scale national monuments differ in significant ways from previously designated monuments (Ranchod 2001). First, presidential proclamations of a landscape monument will state that monument management is "subject to existing valid rights" and will often explicitly note that grazing rights are not to be attenuated by monument designation. Second, in contrast with previous monuments, which were almost invariably transferred to the National Park Service to be managed under a preservation/recreation principle, landscape monuments remain under control of the federal agency managing the land at the time of designation. Third, the very large size of landscape monuments will almost certainly isolate inholdings of other landowners, introducing possible management complications regardless of existing valid rights. Finally, national monuments administered by the Bureau of Land Management (BLM) are included in its National Landscape Conservation System and are to be managed in cooperation with local communities (Daly and Middaugh 2006). In addition to government-community collaboration in developing shared public land goals, government-run visitor centers and commercially provided visitor services are placed in communities adjacent to the national monument (not within its boundaries) so that local communities may directly benefit from monument designation and management.

The GSENM is the oldest national monument included in the National Landscape Conservation System and has had its management plan in place for nearly two decades, making it an ideal case study with which to examine the economic effects of a landscape-scale national monument. Following a description of the GSENM, we review trends in the three economic sectors most affected by the designation—agriculture, mining, and tourism. This is followed by an analysis of county-level per capita income using difference-in-differences and synthetic control methods. Designation of the GSENM has been followed by additional landscape-scale monuments in other states; thus, our methods and results have general applicability throughout public lands states.

2. The GSENM and Its Region

The GSENM, located in Utah's Garfield and Kane Counties, is administered by the BLM, an agency with decades of experience managing extractive activities on public lands. After a postdesignation land exchange, the monument achieved its final size of 1.87 million acres (about 2,920 mi^2) in 1999, making it the country's largest national monument outside of Alaska. The monument extends over 49% of Kane County's area and 18% of Garfield County's area (Figure 1). It features three distinct regions: the western Paria region, bordering Bryce Canyon National Park and

Figure 1
The Grand Staircase–Escalante Region



including the Grand Staircase geologic formation; the Kaiparowits Plateau region, located centrally and home to abundant fossil fuel deposits; and the Escalante Canyons region, extending northeast to the monument's border with Capitol Reef National Park. According to a Government Accountability Office report (1997), 74 grazing allotments (spread throughout the monument) were in place at the time of designation, as were 89 oil and gas leases (covering nearly 140,000 acres) and 22 coal leases (59,000 acres). Of these, all of the grazing allotments were active, six oil wells were in production, and no coal lease was actively producing. While little private land was included within GSENM boundaries, some 200,000 acres of land and 76,000 acres of mineral interests held by Utah's State Institutional and Trust Lands Administration (SITLA) were enclosed.

Garfield and Kane Counties are sparsely populated; in 1996, county population densities were 0.85 and 1.48 persons per square mile, respectively. Like many rural regions of the west, the economies of Garfield and Kane Counties have been based historically on agriculture and mining. Agriculture is dominated by cattle ranching and heavy reliance upon public range administered by the BLM. Garfield County experienced a short-lived uranium boom (peaking in 1980) and has an active oil field that extends into the monument. Kane County hosts a coal mine near the town of Alton, just west of the monument and south of Bryce Canyon National Park. Both counties have tourism sectors supported by nearby national parks and public lands. The city of Kanab (in Kane County) is especially well placed on U.S. Highway 89 because three national parks—Bryce Canyon, Grand Canyon, and Zion—are all within an hour's drive. Garfield County's State Route 12, named an All-American Road in 2002, traces the northern edge of the monument and connects Bryce Canyon National Park with Capitol Reef National Park. Like Kanab, the relatively small towns located on State Route 12 enjoy economic benefits of public land tourism. From the year 2000, when the first reliable visitor information was available, visitation to

GSENM has risen from 563,000 persons per year to over 926,000 in 2016, representing an annual growth rate of almost 3.2% per year.

3. Effects on Key Industries in the GSENM Region

In recent testimony about the GSENM before the House Committee on Natural Resources, a Utah official stated that monument status has prohibited extractive industries "which have, for over 100 years, provided jobs for residents and revenues for businesses and local governments" (Clarke 2017). The County commissions of both Garfield and Kane Counties passed nearly identical resolutions (Resolutions No. 2017-02 and No. R2017-1, respectively) in favor of adjusting monument boundaries, specifying that "for more than 20 years the GSENM has had a negative impact on the prosperity, development, economy . . . and well-being of local communities." Indeed, the compound annual growth rates of population, employment, and per capita income in the region during the predesignation period of 1970–1996 were greater than during the postdesignation period of 1996–2015 (Appendix Table A1). However, the same can be said for the state of Utah as whole. If growth measures are slowing for the entire state, then the effect of the GSENM on its host counties must be separated from the more general statewide trend.

The Livestock Industry

Local and state officials have stated that monument designation has negatively affected the livestock industry. For example, the Garfield and Kane County resolutions note that the GSENM "has resulted in diminished grazing rights." In fact, at least two other contemporaneous issues influenced livestock producers during the postdesignation period: the cattle cycle and drought. Livestock producers in the region specialize in sales of cattle and calves, so a key measure of market conditions is inventory of beef cows. The beef cow herd follows the cattle cycle, rising when market conditions are promising and decreasing when market conditions deteriorate. The national cattle cycle peaked in 1996, the same year that GSENM was designated. Agricultural census data can be used to compare the beef cow inventories of Garfield and Kane Counties with that of the state, net of the Garfield and Kane herds.[1] State and regional herd sizes follow the same general pattern until 2002 when the state beef cow herd hit its trough, whereas herd size in Garfield and Kane Counties continued to decline (Appendix Figure A1).

Clearly, some portion of the regional decline in herd size and ranch profitability is associated with the cattle cycle and not the monument, but why the continued decline in the regional herd size? The BLM claims that, subject to limits outlined in individual grazing permits, stocking levels in the GSENM are largely determined by climatological factors. The modified Palmer Drought Severity Index shows that the region has suffered more dry years (15 years) than wet (6 years) since the monument's 1996 designation. Livestock producers counter that allotments in the GSENM are subject to additional regulatory burdens that have reduced range productivity because producers (1) have difficulty maintaining or improving water structures and fencing, (2) are prevented from reseeding the range with desirable grasses, and (3) cannot stop encroachment of woody tree species, resulting in a less productive, decadent sagebrush ecosystem (Heaton and Miller 2015).

We can examine the drought hypothesis using annual *Billed AUMs*, which measures receipts received by the BLM for each animal unit month (AUM) paid for by producers who graze animals on the monument's land. (One AUM measures the amount of forage consumed by a cow and her calf in one month.) These data were obtained from the BLM GSENM Field Office for the period 1996 through 2016 (n = 21). Annual *Billed AUMs* averaged 41,061 over the period, with a minimum of 15,980 in 2003 and a maximum of 65,918 in 1999. The GSENM lies almost wholly within Utah Climate Division 4, for which monthly measures of the modified Palmer Drought Severity Index (*Drought*

[1] USDA Census of Agriculture, various years, available at www.agcensus.usda.gov/publications.

Index) were obtained and averaged to annual values (National Integrated Drought Information System 2017). The index is essentially a z-score for drought conditions, with a positive value indicating a wet year and a negative value indicating a dry year. Average conditions were slightly dry over the sample period, with a mean of −0.25 (minimum = −3.93, maximum = 4.26).

Normalized values of *Billed AUMs* and Drought Index show a strong correlation during the early part of the times series, with two extremely wet years (2005 and 2011) weakening the correlation in the latter part of the times series (Appendix Figure A2). For the full 21-year time period the sample correlation is $\rho = 0.39$. State officials agree that drought has had some impact on the ability of ranchers to utilize fully their allotments but claim that *Billed AUMs* do not accurately measure actual use of the range and therefore cannot be used to measure declining range quality.[2] First, *Billed AUMs* measure AUMs paid for in advance of the grazing season and are based on planned use of the public range. Should range conditions warrant, actual use of forage may be less than planned use. Ranchers may request repayment of grazing fees should they use fewer AUMs but, at $1.35 per AUM, the economic incentive to seek repayment is not very high. Second, ranchers must demonstrate "substantial use" of their permits on the federal range in 7 out of 10 years to remain compliant with the conditions of use for their allotment. The contractual terms of grazing permits thus incentivize ranchers not to seek repayment for AUMs they did not actually use. Finally, ranchers have only limited alternatives to public land: 88% of land in the two counties is owned and administered by the federal government, whereas only 7.4% of land is owned privately. Ranchers can protect the scale of their operations by paying for substantial use of the allotment so as to maintain access to public grazing lands even when not supported by current market or range conditions. Thus, allotment-level time-series data on actual range use would be required to analyze fully the claim of a decreasing trend in range quality. Such data are not available at this time.

[2] Personal communication with R. Johnson and A. Rampton, Utah Public Lands Policy Coordination Office, July 3, 2017.

The Energy Industry

An estimated 11.3 billion short tons of recoverable coal—and as much as 16 billion tons—reside on the Kaiparowits Plateau in the central portion of the GSENM (Allison 1997). A 3,000 MW coal-fired power plant, to be placed on the plateau and fed by locally produced coal, was proposed in the 1960s. Transmission lines were to cross the Colorado River and connect with existing lines delivering power to southern California. However, projected emissions from the planned power plant would not satisfy air quality standards under amendments to the Clean Air Act passed in 1977. A key constraint to coal development on the plateau then became off-site transportation of mined coal, and several transportation alternatives were examined (Environmental Research and Technology 1980). Trucks could be used at relatively low production levels (<3 million tons per year), but heavy truck traffic would require significant upgrades to Utah State Route 12. Under the medium or high production levels, either rail transport or coal-slurry pipelines would be required.

At the time of designation, the major coal lease holders were Andalex Resources Corp. and PacifiCorp. Andalex, in particular, was nearing completion of its environmental impact statement (Halden 1997); it held 17 coal leases covering 35,000 acres and planned to produce 2.5 million tons per year (Rasband 1999; Allison 1997). Utah's state trust land agency, SITLA, also held about 200,000 acres of rights within the GSENM; these lands were estimated to hold approximately 140 million tons of recoverable coal (Allison 1997). Finally, by the time the monument was designated, the plateau's Upper Valley oil field was producing 240,000 barrels of oil per year.

Numerous legal scholars have noted that just because the proclamation honored the validity of existing leases, monument designation effectively precluded use of any as yet unexploited leases (Halden 1997; Foley 1998; Rasband 1999). Even if an environmental impact statement were approved, firms

still would have faced substantial hurdles in subsequent permitting processes for mine operations and transportation of coal off the plateau, thus raising the transactions costs of developing existing leases. Indeed, both Pacificorp and Andalex eventually exchanged their GSENM leases for cash and leases on other federal lands. SITLA's inholdings were satisfied with an exchange for 145,000 acres elsewhere in the state, plus a $50 million cash payment (under Public Law 105-335). Thus, the primary effect of monument designation was to preclude future energy development within the monument, which remains to this day an opportunity cost of designation. However, nothing associated with the designation affected then actively producing energy leases on monument land (e.g., the Upper Valley oil field is still in production). Thus, the monument designation did little to disturb income and jobs derived from the energy industry at the time of designation.

The Tourism Industry

Many of the annual 925,000 visitors to the region are attracted by the "Grand Circle" of national parks in southern Utah and northern Arizona. The GSENM is located within this circle, and the trend in GSENM visitation is similar to that of nearby national parks. The monument's 3.16% annual growth rate in visitation slightly exceeds the growth rate of 2.95% for Bryce, Capitol Reef, Grand Canyon, and Zion National Parks (National Park Service 2017). Annual GSENM visitation is highly correlated with visits to nearby national parks ($0.79 < \rho < 0.87$) but is less correlated than national parks are with one another (all $\rho > 0.93$; Appendix Table A2). These correlations are supported by a 2004 survey in which 80% of GSENM visitors reported they were primarily motivated to visit a national park; only 20% of respondents said that visiting the monument was the primary purpose of their trip (Burr et al. 2006). Thus, a significant portion of monument visitation is bycatch of Grand Circle tourists already planning to enjoy the region's other sites.

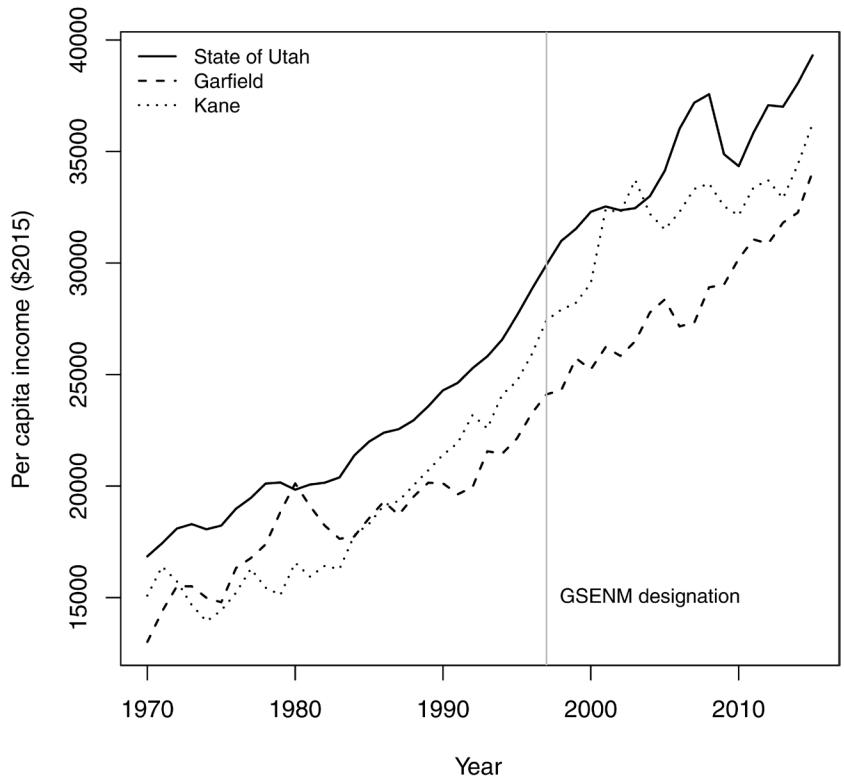
More generally, Leaver (2016) used proprietary data to measure county-level dependence on the "leisure and hospitality" (LH) sector. In 2014, 48% of jobs in Garfield and Kane Counties were in the LH sector (not including indirect and induced jobs), providing about 40% of wage income in both counties. Our own shift-share analysis of employment growth between 1990 and 2010 in NAICS Sectors 71 and 72 (arts, entertainment, and recreation; accommodations and food services) indicates that 75% of sectoral growth in Garfield County was due to its competitive share; for Kane County the competitive share was 59%. That is, the LH sector grew very quickly even after accounting for national sectoral growth and the already favorable industry share in the study region. Of course, the portion of LH employment and employment growth directly attributable to the monument remains unknown.

While strong employment growth in the LH sector is important in developing rural economies, some critics point to low wages and high rates of seasonal unemployment in this industry. Nationally, hourly wages in the LH sector are less than 50% of the wage received in the mining and logging sector (Bureau of Labor Statistics 2017a). These wage rates imply that a loss of 25 jobs in the mining/logging sector must be offset by nearly 52 jobs in the LH sector if a county is to hold total income constant. Hence, increasing county dependence on job growth in the relatively low-wage LH sector could cause growth in per capita income to slow over time. Further, seasonal unemployment in Garfield and Kane Counties can exceed 20%. Finally, another feature of the seasonal LH industry is reliance on international workers on short-term work visas. Although Bureau of Economic Analysis income data are net of earnings by those who do not reside in the region, reliance of the industry on out-of-region workers will reduce the local economic impact of tourism.

4. Effects on Per Capita Income

It has been argued by many that designation of the GSENM has favored the low-wage, high seasonal unemployment tourism industry over ranching and mining, the more traditional public lands industries. Our industry-level analysis has revealed that (1)

Figure 2
Trends in Per Capita Income, 1970–2015



regional livestock production has fallen from its mid-1990s peak, but this could also be the result of the cattle cycle and regional drought, (2) diminished energy prospects are a real opportunity cost but one that did not affect ongoing energy activities in the region, and (3) employment in relatively low-wage tourism sectors is, indeed, growing in the region. But what is the net effect of monument designation on per capita income in the region? Figure 2 shows the path of per capita income for Garfield and Kane Counties and the state of Utah. Long-term income trends in the counties affected by the monument are not discernably different from the state as a whole, so any effect of the monument must be disentangled from the broader economic trends affecting other counties in the region. We do so using two econometric approaches. Table 1 provides descriptive statistics for the data used in our analysis.

Difference-in-Differences

A difference-in-differences (DD) approach measures the effect on per capita income of a treatment (GSENM designation) on the "treated" counties (Garfield and Kane) against per capita income observed for a set of "control" counties not affected by monument designation. Three sets of control counties are used: the first set consists of all of Utah's remaining 27 counties plus Arizona's Apache and Navajo Counties, which are located along the Utah border. (Two other border counties, Coconino and Mohave, were dropped from the analysis because national monuments were designated in each county in 2000.) The second set of controls is the 13 Utah counties making up roughly the southern half of the state, while the final set is composed of the 6 southern-most Utah counties, or roughly the southern quarter of the state. As the number of control counties gets smaller, we are pre-

Table 1
County Characteristics Used in Econometric Analysis

Variable	Source	*N*	Mean	Std. Dev.
Per capita income ($2015)	BEA	1,426	23,972	9,285.64
Population density	BEA	1,426	79.30	232.30
% total income from farms	BEA	1,426	3.27	5.11
Annual growth, all employment	BEA	1,426	2.63	4.78
Annual growth, farm employment	BEA	1,426	0.62	9.81
Annual growth, private nonfarm employment	BEA	1,426	3.51	7.33
Annual growth, government employment	BEA	1,426	1.70	4.40
% farm employment	BEA	1,426	9.64	8.93
% private nonfarm employment	BEA	1,426	68.46	13.60
% government employment	BEA	1,426	21.90	10.14
Industrial mix employment growth (farm, private nonfarm, government)a	BEA	279	1.05	0.05
Beef cattle per square mile	Agricultural Census	273	5.86	5.29
% population, female	Censusb	155	49.73	1.02
% population, nonwhite	Censusb	155	10.36	17.55
% population over age 15, married	Censusb	155	64.57	6.68
% population, college graduate	Censusb	155	15.50	6.85
% population over age 16, in labor force	Censusb	155	60.78	7.04
% population, living in poverty	Censusb	155	14.44	8.18
Unemployment rate	Censusb (1970, 1980); BLS (1990–2015)	868	5.77	2.86

Note: BEA, Bureau of Economic Analysis; BLS, Bureau of Labor Statistics.
[a] Industrial mix measured at five-year intervals following Partridge et al. (2012).
[b] Census data downloaded from Minnesota Population Center (2016). Unemployment data from Bureau of Labor Statistics (2017b).

sumably selecting those counties whose demographic, economic, natural resource, and geographic features most closely resemble those of the treated counties. All counties receive equal weight in the analysis.

Per capita income and employment data (1970–2015) were downloaded from the Bureau of Economic Analysis (2017) and arranged for panel regression. A Levin-Lu-Chu test rejected the null hypothesis of a unit-root in the panel data. Linear dynamic models were estimated using the Arellano and Bond (1991) estimator, which incorporates fixed effects (v_i) that capture time-invariant idiosyncratic features of each unit i (in our case, a county), as well as the lagged effects of per capita income:

$$PC\ Income_{it} = \beta_0 + \beta_1\ PC\ Income_{it-1} + \beta_2\ Annual\ Employment\ Growth_{it} + \beta_3\ Postdesignation\ Year + \beta_4\ GSENM\ County + \beta_5\ Postdesignation\ Year \times GSENM\ County + v_i + \varepsilon_{it}.$$

Postdesignation Year is a dummy variable taking the value of one in 1997 and later, and the value zero in earlier years; *GSENM County* takes the value of one for Garfield and Kane Counties, and zero for all other counties.

The DD parameter of interest is β_5, which measures the postdesignation change in income in the treatment counties. Our modeling approach assumes that the fixed effects and lagged income will capture the bulk of the inherent differences across counties. The inclusion of the lagged dependent variable on the right-hand side introduces endogeneity because the first-differenced lag term is correlated with the first-differenced disturbance term. The Arellano-Bond estimator uses the higher-order lags of the dependent variable as instruments for the endogenous variable. Further, the Arellano-Bond estimator requires that serial correlation in the idiosyncratic disturbance term (ε_{it}) be limited to a first-order lag; any higher order correlation in ε_{it} would make some (higher order) lags of the dependent variable a potentially invalid instrument. Hence, the set of instruments was determined based on the results of the Arellano-Bond test for autocorrelation.

The estimates for the DD dynamic panel data model are presented in Table 2. Column 2 uses the greatest number of controls, including all counties in Utah and two in Arizona. Per capita income is statistically related to lagged

Table 2
Difference-in-differences, Linear Dynamic Panel Data Model Results, 1970–2015

Variable	29 Control Counties	13 Control Counties	6 Control Counties
PC Income, t – 1	0.979 (0.001)	0.939 (0.001)	0.922 (0.001)
Annual Employment Growth, t	108.345 (0.001)	90.400 (0.001)	77.059 (0.001)
Postdesignation Year	591.309 (0.001)	844.842 (0.001)	934.620 (0.005)
Postdesignation Year × *GSENM County*	−23.894 (0.868)	103.442 (0.488)	237.024 (0.128)
Intercept	423.648 (0.233)	1,123.765 (0.001)	1,379.100 (0.006)
N	1,395	675	352
p-Value for H_0: all $\beta = 0$	0.001	0.001	0.001
p-Value for H_0: Overidentifying restrictions are valid (Sargan-Hansen test)	0.001	0.273	0.627

Note: Dependent variable: *Per Capita Income* ($2015); p-values in parentheses based on robust standard errors. Treatment counties: Garfield, Kane; 29 control counties: remaining 27 counties in Utah plus two northern Arizona counties (Apache, Navajo); 13 control counties: Beaver, Carbon, Emery, Grand, Iron, Juab, Millard, Piute, San Juan, Sanpete, Sevier, Washington, Wayne; 6 control counties: Beaver, Iron, Piute, San Juan, Washington, Wayne.

Per Capita Income; the parameter is less than one, indicating a stable rate of growth. A 1% increase in *Annual Employment Growth* increases per capita income by just over $108. The *Postdesignation Year* variable allows mean per capita income in the postdesignation period to depart from that of the predesignation period; in each postdesignation year per capita income is $591 higher than in the years prior to designation for all counties. The treatment effect of the monument on Garfield and Kane Counties, as measured by the *Postdesignation Year* × *GSENM County* variable, has a negative point estimate (–$23.89) but is statistically insignificant (*p*-value = 0.87). The Sargan-Hansen test of overidentifying restrictions suggests that our model instruments are weak.

The full set of 29 controls used in the previous model includes counties that are not closely similar to Garfield and Kane. For example, counties along the Wasatch Front are highly urbanized and have more diversified economies, other counties may not have developed tourism sectors, and still others do not have the "red rock" landscape for which Garfield and Kane are famous. Column 3, for 13 control units corresponding to the southern half of the state, shows results that are qualitatively similar to those for the full set of controls. Here, a 1% increase in *Annual Employment Growth* adds approximately $90 to per capita income, whereas incomes in all counties during the postdesignation period were greater by $845. The only difference with the full set of controls is that the point estimate of the treatment effect, *Postdesignation Year* × *GSENM County*, is now positive ($103.44), but the coefficient remains statistically insignificant (*p*-value = 0.49). The Sargan-Hansen test indicates that the instruments are jointly valid (exogenous).

Finally, column 4 of Table 2 restricts the control counties to only those that are in direct proximity to the treatment counties. A 1% increase in annual employment growth adds $77 to per capita income. During the postdesignation period all counties added about $935 to annual per capita income relative to the predesignation period. The point estimate of the treatment effect is $237.02 but remains insignificant (*p*-value = 0.13) at levels conventionally used for hypothesis tests. The instruments are jointly exogenous, as indicated by the Sargan-Hansen test.

Synthetic Control

Our DD modeling shows that, regardless of the control counties selected for comparison, we could find no statistically significant treatment effect. But traditional regression methods for comparative case studies are subject to somewhat arbitrary selection of the control group, which is typically based on subjective measures of similarity to the affected units prior to the intervention. Therefore, DD analysis will always include a certain level of ambiguity as to whether any of the selected control groups credibly approximate the counterfactual outcome. If the DD analysis used inappropriate comparison units, then spurious statistical

Table 3
Weights for Synthetic Control County

Garfield		Kane	
County	Weight	County	Weight
Wayne	0.282	Wasatch	0.358
Duchesne	0.270	Iron	0.337
Tooele	0.250	Washington	0.175
Navajo (AZ)	0.090	San Juan	0.075
Piute	0.052	Summit	0.054
Grand	0.048		
Davis	0.006		
Apache (AZ)	0.002		

Note: The synthetic control county was constructed from 29 donor counties. Counties with nonzero weights are reported here. AZ, Arizona.

inferences may result: any differences in outcomes between exposed and control units may simply originate from inherent differences between the two units.

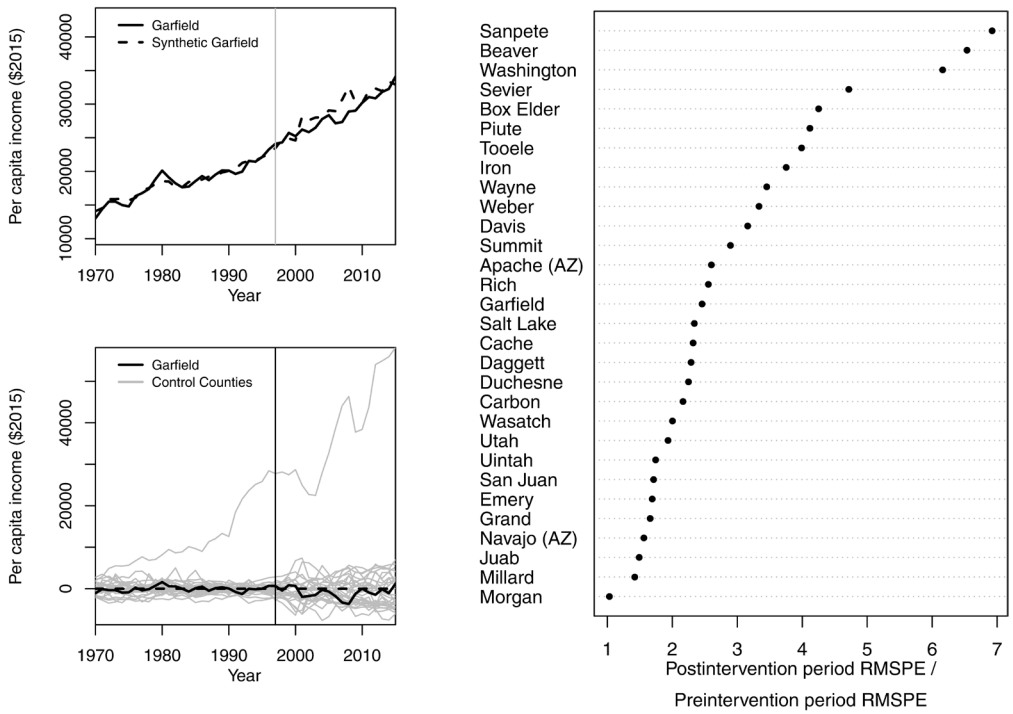
The synthetic control method avoids such limitations by offering data-driven procedures to select a suitable comparison group. The basic idea behind synthetic control is that a weighted average of several unaffected units can produce a synthetic control unit that is more similar to the exposed unit than any single control unit (Abadie, Diamond, and Hainmueller 2010). Intuitively, it is difficult to find an unaffected county that is similar to an affected county in all, or even most, of its observable characteristics. However, a synthetic control can approximate the exposed unit more effectively because it will be composed of a weighted combination of available control units, each of which may closely approximate one or more characteristics of the affected unit. The weight, or the relative contribution, of each control unit to the counterfactual outcome (the synthetically composed unit) is determined based on how closely the characteristics of the control unit match those of the treated unit during the preintervention period. The result is a synthetic control unit designed such that it best reproduces the characteristics of the exposed unit in the preintervention period. Counterfactual outcomes can then be recovered from the postintervention outcomes of the synthetic control unit. Abadie, Diamond, and Hainmueller (2010) outline the theoretical properties and methodological approach in developing a synthetic control, while studies by Abadie and Gardeazabal (2003), Billmeier and Nannicini (2013), Cavallo et al. (2013), Abadie, Diamond, and Hainmueller (2015), and Ando (2015) are representative of the numerous empirical applications using this approach.

We again rely on the county-level panel data for the period 1970–2015, and the outcome of interest remains per capita income. The GSENM is spread over two treatment counties; our approach is to construct a synthetic control for each county using the set of county characteristics listed in Table 1 and all 29 possible control counties. We evaluate the quality of our model specification by choosing the specification yielding the minimum root mean squared prediction error over the entire preintervention period. Table 3 reports the county weights for the donor counties used to construct each synthetic control. Figures 3 and 4 show the synthetic control results for Garfield and Kane Counties, respectively.

A good synthetic control unit will closely track the time path of per capita income for the treated unit during the predesignation period; departures of the synthetic control path from the actual path during the postdesignation period measures the treatment effect, or the counterfactual scenario. That is, our counterfactual scenario answers the question, "What would per capita income have been had the monument *not* been designated?" Turning first to the top left of Figure 3 we see the time path of per capita income for the synthetic control (dashed line) tracks the actual path for Garfield County (solid line) quite closely during the predesignation period. Per capita income for the synthetic control departs from, and is greater than, the actual path during most of the postdesignation period. This suggests that per capita income in Garfield County would have been higher in most years had the monument not been designated. The mean percentage difference between the counterfactual and actual income paths over the 19 years of the postdesignation period is estimated to be −3.21%, with a range between −12.78% and +3.44%.

One can think of the mean difference as a point estimate of the mean annual effect of monument designation. The synthetic control method does not report a standard error for

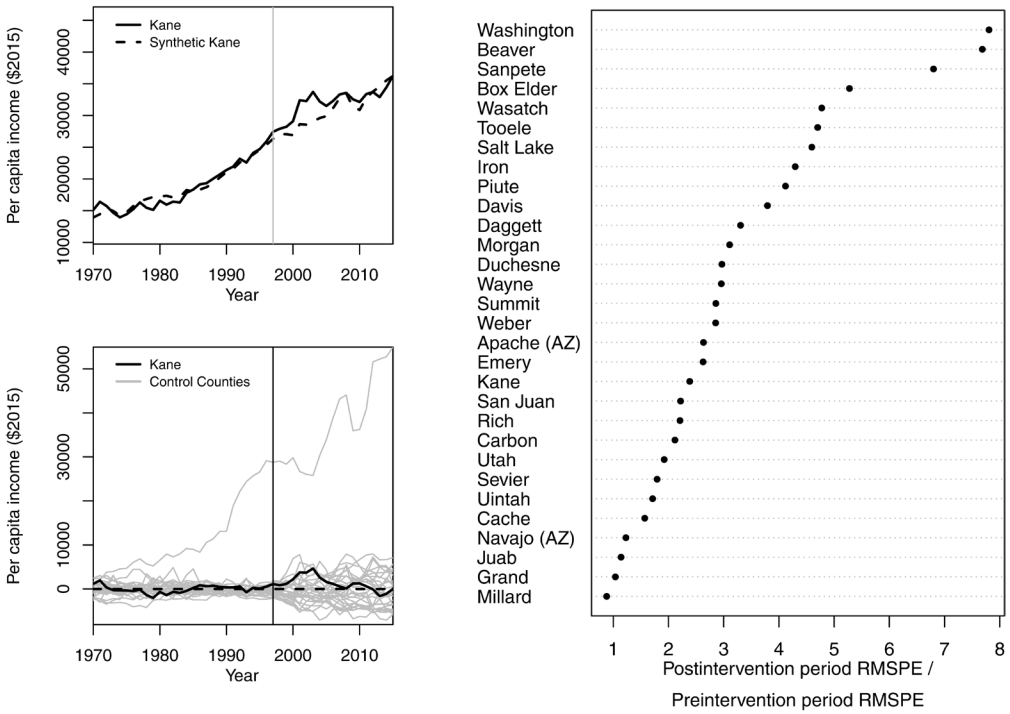
Figure 3
Synthetic Control Analysis for Garfield County, 1970–2015



this point estimate, thus complicating our assessment of whether it is significantly different from zero. Instead, we conducted a series of falsification tests, or placebo studies. Here, each of the 29 potential donor units (control counties) is considered as if it were assigned the treatment when, in fact, it was not. The time path of income for such a placebo unit should not depart considerably from that of its synthetic control in the postdesignation period because there should be no designation effect. If our estimate of the designation effect for Garfield County is truly measuring the effect of the monument, then there should be few placebo counties, if any, showing a similar gap. The bold line at the bottom left of Figure 3 shows the actual-counterfactual gap for Garfield County, while the gray lines show gaps for the 29 placebo trials. It is evident that the Garfield County gap is matched by many placebo units throughout the postdesignation period. Therefore, the statistical significance of the −3.21% point estimate of an average annual gap is in question.

Another way to assess the point estimate is to use the placebo trials to compare the ratio of the root mean square prediction error (RMSPE) after designation to the RMSPE before designation, where the RMSPE captures the difference between per capita income for a county and its synthetic control estimate. A large postdesignation RSMPE implies a large designation effect so long as the synthetic control is able to closely reproduce the treatment outcome in the predesignation period. Hence, if a designation effect is indeed present, one would expect the ratio of the postdesignation RMSPE for a treated unit relative to its predesignation RMSPE to be quite large. Placebo units should not have a designation effect, so the post- or predesignation ratio should be relatively small. The right-hand side of Figure 3 ranks the placebo trial ratios from largest (Sanpete County) to smallest (Morgan County). With an RMSPE ratio of about 2.46,

Figure 4
Synthetic Control Analysis for Kane County, 1970–2015



Garfield County ranks fifteenth in RMSPE ratio, behind 14 of the 29 placebo counties; this corresponds to a *p*-value of about 0.50 (i.e., 15/30). This is not statistically significant, so we fail to reject the null hypothesis of no designation effect in Garfield County.

Similar analysis was conducted for Kane County. In this case we see that the actual time path of per capita income (the solid line in the upper left portion of Figure 4) was greater than the counterfactual path (dashed line) throughout much of the postdesignation time period, indicating that Kane County benefited from monument designation. The average annual gap over the 19 years since designation was +4.0%, with a range between −5.0% and +13.8%. Our falsification tests show that the gap between actual income and income for the counterfactual unit (the bold line in the lower left graph of Figure 4) was often replicated by placebo counties (gray lines). Kane County's ratio of postdesignation RMSPE to predesignation RMSPE (2.38) ranks behind 18 placebo counties (the right-hand portion of Figure 4). This corresponds to a *p*-value of 0.64 (i.e., 19/30). Again, the analysis suggests that there has been no designation effect on per capita income in Kane County.

Comparison of DD and Synthetic Control

Regardless of the method used, DD or synthetic control, the data imply that designation of the GSENM has not affected per capita incomes in Garfield and Kane Counties. Each model estimated using the DD approach resulted in relatively small point estimates of the change in income (less than 1% of mean per capita income during the postdesignation period). In contrast, the synthetic control estimates for each county suggest larger designation-related income gaps. Based on per capita income in the two counties, the synthetic control approach resulted in rather large mean predicted income gaps of about −$899 per year for Garfield County and +$1,254 per year for

Kane County. How can this large designation effect be reconciled with the smaller DD point estimates reported in Table 2, which range between −$23.89 and +$237.02? The key is in interpreting the DD point estimate: it is the effect on per capita income averaged across both counties over all 19 postdesignation years. We can make a rough comparison by taking the average of the population-weighted annual postdesignation gaps predicted by the synthetic control method. This yields a mean gap of +$334.96 per year for the two counties. This point estimate lies outside the 95% confidence bound for the model with 29 control units but within the 95% confidence interval for the DD models with 13 and 6 control units. These results suggest the DD and synthetic control results are broadly consistent with one another.

5. Conclusions and Discussion

The GSENM is the oldest landscape-scale monument to be included in BLM's National Landscape Conservation System. Evaluation of the monument's impact on livestock producers is confounded by the contemporaneous effects of a downturn in the cattle cycle, periodic regional drought, and counterintuitive incentives introduced by allotment contracts. Legal scholars accurately predicted that little new energy development would occur following designation despite several firms and the State of Utah holding existing valid energy leases on the monument. However, energy extraction operations active at the time of the monument's proclamation—which were protected as existing valid uses—have continued to this day. Finally, the region has seen rapid growth of its relatively low-wage tourism sector. The cumulative effect of these industry changes were examined with econometric analysis of county-level per capita income. Both difference-in-differences and synthetic control approaches revealed no statistically measureable changes in per capita income resulting from monument designation. Further, the two approaches yield results that are consistent with one another, showing our finding to be robust. Although we have focused on a single monument, the procedures used here can be applied to landscape-scale monuments designated elsewhere.

Our analysis has addressed only the market-level effects of monument designation as measured by income flowing to county residents; it has not examined any nonmarket values associated with preservation of in situ antiquities and natural landscapes on the GSENM. Burr et al. (2006) estimate that only 20% of the 635,000 visitors in 2004 were motivated primarily to visit to the monument (about 127,000 "primary" visitors). If we conservatively assume that the monument has not become more widely known in the subsequent 12 years, and that the primary visitation rate has remained constant at 20%, then total visitation in 2016 (926,000) implies 185,000 primary visitors, or an increase in annual primary visitation of 46%. Hence, it would appear that monument designation has increased nonmarket use values while imposing no statistically significant loss in market value as measured by county-level per capita income.[3] Of course, recreational use value does not include other sources of nonmarket value held by a population much larger than those who choose to visit the monument in any given year. Among other nonmarket values are *option value*, the willingness of a person to pay today for the option to visit a preserved landscape at some time in the future, and *bequest value*, the willingness to pay to preserve the monument for the benefit of future generations.

The county-level income modeling indicates that any income losses associated with GSENM designation in one industry have been offset by income gains in another. Further, these balancing effects have occurred over a relatively small geographic unit, namely, the county. Proclamations of landscape-scale monuments call for management plans that are crafted to protect existing valid uses; as such, they are clearly intended to minimize short-run disruption to local economies even if long-term expansion of extractive industries

[3] Monument designation is likely to have negatively affected some recreational activities, such as ATV trail closures to protect historic and scientific objects identified in the proclamation. The large increase in total visitation to GSENM would suggest that any losses in some recreational activities have been outweighed by gains in other activities.

is to be prevented. The monument appears to have increased nonmarket value through the preservation of cultural antiquities and natural landscapes while minimizing disruption to per capita income growth in the host counties. By this standard, the landscape-scale approach to preservation of the Grand Staircase–Escalante area may be judged a success.

Writing about monuments established by the Antiquities Act, Rasband (2006) notes "Monument proclamations are met by a firestorm of protest in the affected community but the protest is followed by acquiescence and then acceptance" (p. 137). If the monument has caused no discernable change in the time path of income, then surely, after more than 20 years, local communities must be far along the path to "acceptance." In fact, this is not the case; Utah's elected officials prevailed upon President Trump to assure that the GSENM would be included in the EO 13792 review.

If economic factors are indeed the rationale for ongoing protest by Utah officials then, given the county-level results reported here, any clearly negative changes in economic activity spurred by monument designation must have taken place at finer geographic resolution, and future analysis may wish to examine economic effects at the town level. This would also allow analysts to examine any distributional issues within the region. However, a number of challenges will make town-level analysis difficult. First, data at the town level, or Census Designated Place (CDP), are generally available only from the decennial census for years prior to the American Community Survey (for which five-year estimates are available starting only in 2009). Second, the CDPs for which data are available will sometimes change over time, interrupting the time series. Third, the number of CDPs affected by monuments located in the sparsely populated Mountain West is often quite small. For example, the GSENM has, at most, only seven affected gateway communities; even if seven control CDPs could be found there will still be statistical challenges associated with sample size. Thus, the postmatching DD approach of Chen, Lewis, and Weber's (2016) analysis of the Northwest Forest Plan could not be used for analysis of a single national monument.

Jaeger (2006) notes that the general equilibrium effects of restrictions on private land use at the urban-rural interface are often subtle. Within the context of the GSENM designation, some communities may experience amenity-based migration that can bid up land and housing values, perhaps pricing locals out of the market. In communities with no amenity migration, or where local employment opportunities are constrained or available primarily in low-wage industries, land and housing prices may fall as demand falls. We are not aware of any study that has examined land or housing values in communities adjacent to landscape-scale national monuments (which are often larger than national parks). In either case—positive amenity effects or decreased demand for housing—designation could be perceived as having harmed local residents.

Trainor (2006) suggests that local attitudes toward the monument might reflect "value incommensurability." Economic efficiency is but one metric against which to evaluate the social desirability of monument designation; standard economic analysis captures only one of many possible realms of value. In 1997, the land that makes up the GSENM went from multiple-use management dominated by traditional public land industries to one in which the management goal was to preserve values associated with cultural antiquities, paleontological resources, ecosystem services, and aesthetics. Regardless of the "existing valid use" protections of the monument proclamation, the shift from local economic specialization in ranching and mining to the tourism industry—even if it does not change the time path per capita income—threatens to disrupt historical values in place since white settlers first arrived in the late nineteenth century. An editorial appearing in the *Kane County Independent* asked residents, "Do we want to stay in the cattle and sheep raising business, or be lackeys . . . for the wages a tourist agency would pay?" (Bradley 1999, 168). This editorial appeared on October 3, 1912. Thus, a dollar earned in the tourism industry was considered by some to be worth less than a dollar earned in the livestock industry. This may be true in the twenty-first century, as well. In-migration also could have repercussions on local social cohesion emanating from ex-

isting governmental and religious institutions. Finally, the process by which the monument was designated did not include input from local or state stakeholders (Petrzelka and Marquart-Pyatt 2015). Prolonged resistance to the monument may stem from a political process perceived as having violated local values about acceptable procedures to develop and implement public policy.

In light of these alternative realms of value, the ongoing controversy over the monument is likely to be based as much on cultural and social values as those captured by standard economic measures, all filtered through the different experiences and beliefs of people. Bromley's (2003, 2015) discussion of volitional pragmatism suggests that conflict concerning landscape-scale national monuments may arise because there is little fixed belief about national monuments. Economists have not yet generated a national monument literature large enough to reach consensus regarding the economic effects of national monuments. That is, there is no "warranted" or "settled" belief arising from the discipline. Even if economic analysis (or analysis from another discipline) provided results that are considered settled within the discipline, the settled belief may not be considered as "valuable" by those most affected. Valuable beliefs provide the basis of acceptance of a decision. The recent controversy over the Obama-era monuments may reflect this lack of valuable belief. Thus, we observe a refusal to accept landscape-scale national monument decisions "as correct, fair or pertinent" (Bromley 2015, 16).

Postscript

On December 4, 2017, Presidential Proclamation 9682 cut Grand Staircase–Escalante National Monument from 1.9 million acres to 1.0 million acres. Numerous environmental and tribal groups are currently challenging the legality of this action, as well as a concurrent reduction to Bears Ears National Monument.

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References

Abadie, Alberto, Alexis Diamond, and Jens Hainmueller. 2010. "Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program." *Journal of the American Statistical Association* 105 (490): 493–505.

———. 2015. "Comparative Politics and the Synthetic Control Method." *American Journal of Political Science* 59 (2): 495–510.

Abadie, Alberto, and Javier Gardeazabal. 2003. "The Economic Costs of Conflict: A Case Study of the Basque Country." *American Economic Review* 93 (1): 113–32.

Allison, M. Lee. 1997. *A Preliminary Assessment of Energy and Mineral Resources within the Grand Staircase–Escalante National Monument*. Salt Lake City, UT: Utah Geological Survey.

Anderson, William L., and Daniel A. Mizak. 2006. "Politics of Environmental Law: Political Ideology, Elitism, or Urban-Rural Interests?" *Public Choice* 129 (1–2): 131–57.

Ando, Michihito. 2015. "Dreams of Urbanization: Quantitative Case Studies on the Local Impacts of Nuclear Power Facilities Using the Synthetic Control Method." *Journal of Urban Economics* 85: 68–85.

Arellano, Manuel, and Stephen Bond. 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and Application to Employment Equations." *Review of Economic Studies* 58 (2):277–97.

Billmeier, Andreas, and Tommaso Nannicini. 2013. "Assessing Economic Liberalization Episodes: A Synthetic Control Approach." *Review of Economics and Statistics* 95 (3): 983–1001.

Bradley, Martha Sonntag. 1999. *A History of Kane County*. Salt Lake City, UT: Utah State Historical Society.

Bromley, Daniel W. 2003. "Land-Use Policy as Volitional Pragmatism." *Agricultural and Resource Economics Review* 32 (1): 9–17.

———. 2015. "Volitional Pragmatism: The Collective Construction of Rules to Live By." *Pluralist* 10 (1): 6–22.

Bureau of Economic Analysis. 2017. *Interactive Data Tables: Regional Data*. Washington, DC: Bureau of Economic Analysis. Available at www.bea.gov/iTable/index_regional.cfm (accessed 2017).

Bureau of Labor Statistics. 2017a. *Industries at a Glance*. Washington, DC: Bureau of Labor Statistics. Available at www.bls.gov/iag/home.htm (accessed 2017).

———. 2017b. *Local Area Unemployment Statistics*. Washington, DC: Bureau of Labor Statistics. Available at www.bls.gov/lau/ (accessed 2017).

Bureau of Land Management. 2000. *Grand Staircase–Escalante National Monument Management Plan*. BLM/UT/PT-99/020+1610. Cedar City, UT: Bureau of Land Management.

Burr, Steven W., Dale J. Blahna, Doug Reiter, Erin C. Leary, and Nathan M. Wagoner. 2006. *A Front-Country Visitor Study for Grand Staircase–Escalante National Monument*. Institute for Outdoor Recreation and Tourism Professional Report PR2006-01. Logan: Utah State University. Available at https://extension.usu.edu/iort/ou-files/GS-ENM_Final_Report_April_2006.pdf.

Cavallo, Eduardo, Sebastian Galiani, Ilan Noy, and Juan Pantano. 2013. "Catastrophic Natural Disasters and Economic Growth." *Review of Economics and Statistics* 95 (5): 1549–61.

Chen, Yong, David J. Lewis, and Bruce Weber. 2016. "Conservation Land Amenities and Regional Economies: A Post-matching Difference-in-differences Analysis of the Northwest Forest Plan." *Journal Regional Science* 56 (3): 373–94.

Clarke, Kathleen. 2017. "Testimony before the House Committee on Natural Resources: Local Impacts of 'Landscape' National Monuments," May 2, 2017. U.S. House of Representatives Document Repository.

Cline, Sarah A., Stephan Weiler, and Ayse Aydin. 2011. "The Value of a Name: Estimating the Impact of Public Land Designation." *Social Science Journal* 48 (4): 681–92.

Daly, Elena, and Geoffrey B. Middaugh. 2006. "The Antiquities Act Meets the Federal Land Management Policy Act." In *The Antiquities Act: A Century of American Archaeology, Historic Preservation, and Nature Conservation*, ed. David Harmon, Francis P. McManamon, and Dwight T. Pitcaithly, Ch. 13. Tucson: University of Arizona Press.

Eilperin, Juliet. 2017. "Trump Orders Review of National Monuments, Vows to 'End These Abuses and Return Control to the People.'" *Washington Post*, April 26. Available at www.washingtonpost.com/news/energy-environment/wp/2017/04/25/zinke-to-review-large-national-monuments-created-since-1996-to-make-sure-the-people-have-a-voice/?utm_term=.6d6e0e6cfc99.

Environmental Research and Technology. 1980. *Kaiparowits Coal Development and Transportation Study*. Fort Collins, CO: Environmental Research and Technology.

Foley, Colin. 1998. "The Grand Staircase–Escalante National Monument: Balancing Public and Private Rights in the Nation's Lands." *Boston College Environmental Affairs Law Review* 25 (3): 743–70.

Gabe, Todd. 2016. "Effects of the October 2013 U.S. Federal Government Shutdown on National Park Gateway Communities: The Case of Acadia National Park, and Bar Harbor, Maine." *Applied Economics Letters* 23 (5): 313–17.

Government Accountability Office. 1997. "Federal Land Management: Authorized Uses in the Grand Staircase–Escalante National Monument." Letter to Sen. Frank Murkowski, Chairman, Committee on Energy and Natural Resources. Available at www.gao.gov/assets/90/86307.pdf.

Halden, Ann E. 1997. "The Grand-Staircase–Escalante National Monument and the Antiquities Act." *Fordham Environmental Law Journal* 8 (3): 713–39.

Heaton, Kevin, and Gil Miller. 2015. *Livestock Grazing on the Grand Staircase–Escalante National Monument: The Historical and Cultural*

Importance to the Region. Utah State University Extension Bulletin AG/Beef/2015-03pr (September). Logan: Utah State University Extension.

Jaeger, William K. 2006. "The Effects of Land-Use Regulations on Property Values." *Environmental Law* 36: 105–30.

Leaver, Jennifer. 2016. *The State of Utah's Travel and Tourism Industry*. Salt Lake City: Kem C. Gardner Policy Institute, University of Utah. Available at http://gardner.utah.edu/wp-content/uploads/2016/05/TourismReport-v8-May-25.pdf.

Lewis, David J., Gary L. Hunt, and Andrew J. Plantinga. 2002. "Public Conservation Land and Employment Growth in the Northern Forest Region." *Land Economics* 78 (2): 245–59.

Minnesota Population Center. 2016. *National Historical Geographic Information System: Version 11.0* [Database]. Minneapolis: University of Minnesota. Available at http://doi.org/10.18128/D050.V11.0.

National Integrated Drought Information System. 2017. *Monthly Palmer Drought Severity Index for States and Climate Divisions*. Boulder, CO: National Integrated Drought Information System. Available at www.drought.gov/drought/data/noaa-national-climatic-data-center/monthly-palmer-drought-severity-index-states-and-climate.

National Park Service. 2017. *Visitor Use Statistics*. Washington, DC: National Park Service. Available at https://irma.nps.gov/Portal/ (accessed 2017).

Partridge, Mark D., Dan S. Rickman, M. Rose Olfert, and Kamar Ali. 2012. "Dwindling U.S. Internal Migration: Evidence of Spatial Equilibrium or Structural Shifts in Local Labor Markets?" *Regional Science and Urban Economics* 42 (1–2): 375–88.

Petrzelka, Peggy, and Sandra Marquardt-Pyatt. 2015. "Perceptions of Power and Manner of Designation: Impacts on Trust." *Society and Natural Resources* 28: 1261–77.

Ranchod, Sanjay. 2001. "The Clinton National Monuments: Protecting Ecosystems with the Antiquities Act." *Harvard Environment Law* Review 25: 535–89.

Rasband, James R. 1999. "Utah's Grand Staircase: The Right Path to Wilderness Designation?" *University of Colorado Law Review* 70: 483–562.

———. 2006. "Antiquities Act Monuments: The Elgin Marbles of Our Public Lands?" *The Antiquities Act: A Century of American Archaeology, Historic Preservation, and Nature Conservation*, ed. David Harmon, Francis P. McManamon, and Dwight T. Pitcaithly, Ch. 8. Tucson: University of Arizona Press.

Rasker, Ray, Patricia H. Gude, and Mark Delorey. 2013. "The Effect of Protected Federal Lands on Economic Prosperity in the Non-metropolitan West." *Journal of Regional Analysis and Policy* 43 (2): 110–22.

Trainor, Sarah Fleisher. 2006. "Realms of Value: Conflicting Natural Resource Values and Incommensurability." *Environmental Values* 15 (1): 3–29.

Trump, Donald J. 2017. "Review of Designations under the Antiquities Act." *Federal Register* 82 (82): 20429–31.

Weiler, Stephan. 2006. "A Park by Any Other Name: National Park Designation as a Natural Experiment in Signaling." *Journal of Urban Economics* 60 (1): 96–106.

Weiler, Stephan, and Andrew Seidl. 2004. "What's in a Name? Extracting Econometric Drivers to Assess the Impact of National Park Designation." *Journal of Regional Science* 44 (2): 245–62.

Wilkerson, Chad R. 2003. "Travel and Tourism: An Overlooked Industry in the U.S. and Tenth District." *Federal Reserve Bank of Kansas City Economic Review* 2003 (Quarter 3): 45–71.